Rockwell Hardness Testers
CV-600A / CV-600MA / CV-600MA/S

Basic regular Rockwell type tester (600A/MA) and Superficial Rockwell type tester (600MA/S) offering accuracy, reliability and durability at an extremely affordable price

CV-600A
Manually Operated

CV-600MA
Motorised

CV-600MA/S
Motorised Superficial

Features

- Rugged construction, will stand up to the harshest environments
- Direct reading of Rockwell scales HRC, B, A, F or Superficial: HRT, HRN
- Accuracy conforms to EN-ISO 6508 and ASTM E-18
- Easy load force selection by robust dial knob
- Oil brake with variable damping by adjustable knob (CV-600A)
- Large capacity to accommodate large test specimen
- Electronic control of load duration (dwell time) (CV-600MA & CV-600MA/S)
- Motorised testing procedure (CV-600MA & CV-600MA/S)
- Standard delivery including accessories ready for testing all scales

Rockwell Hardness Testers
CV-600A / CV-600MA / CV-600MA/S

TECHNICAL SPECIFICATION

Rockwell scales	
Standard	A, B, C, F (CV-600A/CV-600MA)
Superficial	HRT, HRN (CV-600MA/S)
Hardness resolution	1 of a Rockwell unit
Test loads	
Rockwell	10kgf preload / 60, 100, 150kgf main load
Superficial Rockwell	3kgf preload / 15, 30, 45kgf main load
Display	Dial indicator
Test force application	By force lever (CV-600A) Motorised load system (CV-600MA & CV-600MA/S)
Test cycle	Manual (CV-600A); Motorised (preload applied manually) (CV-600MA & CV-600MA/S)
Load duration	Manually, following display indication (CV-600A), Automatic (CV-600MA & CV-600MA/S)
Dwell time	2-99 sec (1 sec. step) (600MA/S)
Data output	Non
Accuracy	Conforms to EN-ISO 6508 and ASTM E-18
Specimen accommodation	Vertical space 170mm (6.7") Horizontal space (from center-line) 165mm (6.5")
Specimen access	External surfaces
Power supply	Non (600A), 220V 50Hz (600MA & 600MA/S)
Machine dimensions	150mm x 485mm x 700mm (WxDxH)
Machine weight	Approx. 85kg

Standard Delivery

- Main unit
- Diamond Rockwell indenter
- Rockwell ball indenter 1/16"
- Hardness test blocks: ±60HRC, ±25HRC, ±85HRB (CV-600A/MA)
- Hardness test blocks: ±90HR15N, ±80HR30N, ±75HR30T (CV-600MA/S)
- Flat anvil ø 60mm
- Large flat anvil ø 150mm
- V-anvil ø 40mm
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- CV Instruments certificate
- Installation & user manual
- Spare lamps 6V-12W (2pcs) (CV-600MA/S)
- Spare balls 1/16" (5pcs)
- Power cable (CV-600MA/S)
- Fuse 0.5A (2pcs) (CV-600MA/S)

Optional Accessories

- Certified test blocks
- Certified indenters & balls
- Clamping protection nose
- Pedestal spot anvil ø 10mm

Advanced Digital Rockwell Hardness Testers CV-600BDL / CV-600MBDL / CV-600MBDL/S

Basic digital regular Rockwell type tester (CV-600BDL/MBDL) and Superficial Rockwell type tester (CV-600MBDL/S) offering accuracy, reliability and durability at an extremely affordable price

CV-600BDL
Manually Operated

CV-600MBDL
Motorised

CV-600MBDL/S
Motorised Superficial

Features

- OLED full colour multi function display
- Additional advanced functions such as CONVERSION to Brinell, Vickers and all Rockwell scales. USB-2/RS-232 output, printer output for detailed measuring report, Go/No Go limit settings, 99 memory positions, PROGRAM mode stores 50 test program settings, shape correction setting, full statistics
- Direct reading of Rockwell scales HRA, B, C, D, E, F, G, K, L, M, P, R, S (HRN, T, W, X & Y CV-600MBDL/S)
- Accuracy conforms to EN-ISO 6508 and ASTM E-18
- Easy load force selection by robust dial knob
- Oil brake with variable damping by adjustable knob (CV-600BDL)
- Large capacity to accommodate large test specimen
- Selectable control of load duration (dwell time)
- Motorised testing procedure (CV-600MBDL & CV-600MBDL/S)
- Rugged construction, will stand up to the harshest environments
- Standard delivery including accessories ready for testing all scales

Advanced Digital Rockwell Hardness Testers CV-600BDL / CV-600MBDL / CV-600MBDL/S

TECHNICAL SPECIFICATION

Rockwell scales	
Standard	A, B, C, D, E, F, G, K, L, M, P, R, S
Superficial	HRN, T, W, X & Y (CV-600MBDL/S)
Hardness resolution	0.01 of a Rockwell unit
Test loads	
Rockwell	10kgf preload /60, 100, 150kgf main load
Superficial Rockwell	3kgf preload /15, 30, 45kgf main load
Display	Full colour multi function indicator
Test force application	By force lever (CV-600BDL) Motorised load system (CV-600MBDL)
Test cycle	Manual (CV-600BDL); Motorised (preload applied manually) (CV-600MBDL)
Load duration	Manually, following display indication (CV-600BDL); Automatic (CV-600MBDL)
Dwell time	0-99 sec. (1 sec. step)
Measuring protocol	ISO / ASTM / JIS
Indications on display	Progress bar for preload, preload applied, main load applied, dwell time, invalid reading, invalid measurement, invalid procedure, Rockwell value, Go/No Go, shape correction, limits, program number, conversion scale, statistics, scale applied
Accuracy	Conforms to EN-ISO 6508 and ASTM E-18
Specimen accommodation	Vertical space 170mm (6.7") Horizontal space (from center-line) 165mm (6.5")
Specimen access	External surfaces Cylindrical surfaces down to 3mm diameter
Data output	RS-232 and USB
Power supply	Input 110/220V 50/60Hz
Machine dimensions	150mm x 485mm x 700mm (WxDxH)
Machine weight	Approx. 85kg

Standard Delivery

- Diamond Rockwell indenter
- Rockwell ball indenter 1/16"
- Hardness test blocks: ±60HRC, ±25HRC, ±85HRB (CV-600BDL/MBDL)
- Hardness test blocks: ±90HR15N, ±80HR30N, ±75HR30T (CV-600MBDL/S)
- Spare balls 1/16" (5 pcs)
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Power cable
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- CV Instruments certificate
- Installation & user manual

Optional Accessories

- Reference hardness blocks
- Certified indenters & balls
- Clamping protection nose
- Pedestal spot anvil ø10mm

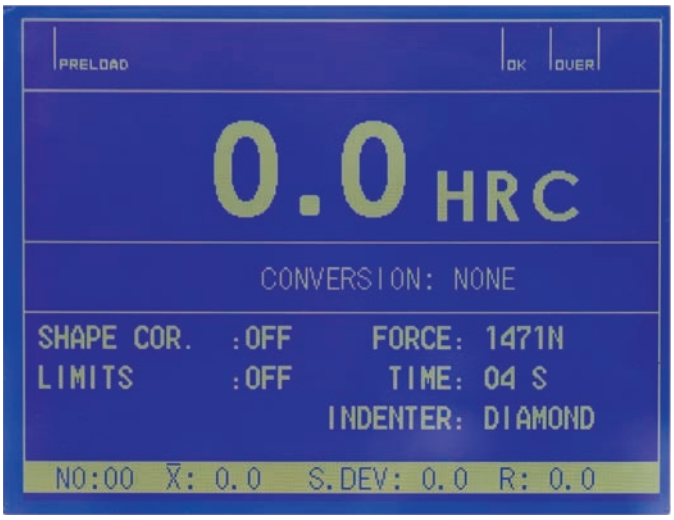
Rockwell Hardness Tester CV-600D

Menu-operated Rockwell hardness tester with LCD screen featuring Go/No Go judgement, conversion, load cycle indicator, date, time.

Features

- Digital LCD reading of 15 regular Rockwell scales
- Conversion to all other hardness scales such as Vickers and Brinell
- Menu operated LCD screen with many functions such as Go/No Go judgement, conversions, load cycle indication, date, time
- Integrated printer for test result and statistics
- RS-232 data output to Microsoft Hyperterminal, 'Win Wedge' etc
- Accuracy, reliability and durability at an extremely affordable price
- Rugged construction, will stand up to the harshest environments
- Accuracy conforms to EN-ISO 6508 and ASTM E-18
- Easy load force selection by robust dial knob
- Large working space accommodates larger specimens
- Standard delivery including accessories ready for testing
- Electronic software calibration mode

Rockwell Hardness Tester CV-600D



TECHNICAL SPECIFICATION

Rockwell scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
Display conversion to	HV, HB, HR scales
Hardness resolution	0.1 of a Rockwell unit
Test loads	60, 100, 150kgf (10kgf preload)
LCD Display	Hardness value, Rockwell scale, test force indicator, dwell time, limits with tolerance check Go/No Go, number of tests, X-bar average, standard deviation, range R
Data entry	Membrane keypad
Test force application	Automatic main load application
Dwell time	2-99 sec
Data output	Built-in printer and RS-232C
Accuracy	Conforms to EN-ISO 6508 and ASTM E-18
Specimen accommodation	Vertical space 170mm (6.7") Horizontal space (from center-line) 165mm (6.5")
Specimen access	External surfaces, Cylindrical surfaces down to 3mm diameter
Power supply	220/240V 50Hz
Machine dimensions	227mm x 516mm x 715mm (WxDxH)
Machine weight	85kg

Standard Delivery

- Built-in thermal printer
- Data-output RS-232C
- Diamond Rockwell indenter
- Rockwell ball indenter 1/16"
- Spare balls 1/16" (5 pcs)
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Hardness test blocks: ±60HRC, ±25HRC, ±85HRB
- Power cable
- Fuse 1A (2 pcs)
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- CV Instruments certificate
- Installation & users manual

Optional Accessories

- Reference hardness blocks
- Certified indenters & balls
- Clamping protection nose
- Pedestal spot anvil ø10mm

Premium Rockwell Type Hardness Tester EW-650 Series

LCD touch screen, superior functionality, ultra high precision, 3 models available

Features

- Measures all standard Rockwell hardness values
- Simultaneous conversion to HV, HB and other HR scales
- Rugged fine casted frame, allowing larger dimension work pieces
- ASTM, ISO, JIS compliant
- ESELOAD unique motorised load application system, auto selection of main loads depending on HR scale (656 & 657 only)
- Superior depth measuring system through Heidenhain (Germany) transducer
- ESETOUCH advanced LCD touch screen & operator panel with user friendly menu operation in multiple languages
- High speed preload, loading and unloading procedure for ultra high efficiency
- ESELIFT (657 only) motorised elevating screw simplifies and speeds up test operation
- Automatic measurement procedure, load / dwell / unload (655 & 656 models)
- ESEMATIC fully automatic positioning and measuring procedure (positioning, preload, load, dwell, unload (657 only))
- Storage of 50 test programs and tester settings, allowing you to set up your tester in just seconds
- Alpha numerical data entry
- Continuous automatic "online" statistics, incl. average of readings etc.
- Storage of 99 single hardness values
- Go / No Go mode
- Convex and concave measuring mode
- Calibration date expired (reminder)
- Service mode including electronic linearity calibration, tests counter, maintenance system
- Prints statistics to built--in printer or external printer
- Built-in high speed printer and USB2 data output with network capability

The EW-655 ESETOUCH with manual load selection and manual elevator lead screw

EW-655 ESETOUCH	Manual load selection Manual elevator lead screw
EW-656 ESELOAD	Automatic load selection Manual elevator lead screw
EW-657 ESEMATIC	Automatic load selection Motorised elevator lead screw/Full automatic

Premium Rockwell Type Hardness Tester EW-650 Series

The EW-657 ESEMATIC model features, as standard, a fully automatic system for high speed production measurement

TECHNICAL SPECIFICATION

Rockwell scales	A, B, C, D, E, F, G, K, L, M, P, R, V
Conversion to	HV, HB, other HR scales
Hardness resolution	0.01 of a Rockwell unit
Pre-load	10kgf
Main loads	60, 100, 150kg
Pre-load application	Manual (automatic for 657 ESEMATIC)
Test load application	Fully automatic
Dwell time	0-99 seconds
Data output	Built in high speed printer & USB2
LCD Display	Hardness value, conversion value, test force indicator, dwell time, memory contents, all machine settings, go / no go, all statistics
Specimen accommodation	Vertical space 275mm
	Horizontal space (from centre of elevator) 190mm
Power supply	110-240V, 50-60Hz
Machine dimensions	Approx. 940mm x 390mm x 670mm (HxWxD)
Net weight	Approx. 140kg

Standard Delivery

- Main unit
- Built-in thermal printer
- Data-output USB2
- USB cable
- Software
- Diamond Rockwell indenter
- Rockwell ball indenter 1/16"
- Spare balls 1/16" (5 pcs)
- Flat anvil ø 60mm
- Flat anvil ø 150mm
- V-anvil ø 40mm
- Hardness test blocks: ±60HRC, ±25HRC, ±85HRB
- Power cable
- Fuse 3A (2 pcs)
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- Machine cover
- ESEWAY® certificate
- Installation & users manual

Optional Accessories

- Clamping nose
- Certified test blocks
- Certified indenters & balls
- Pedestal spot anvil ø 10mm
- Special support system for large work pieces

Premium Twin Scale Rockwell Type Hardness Tester EW-670 Series

LCD touch screen, superior functionality, ultra high precision, 3 models available

Features

- Measures all Standard & Superficial Rockwell hardness values
- Simultaneous conversion to HV, HB and other HR scales
- Rugged fine casted frame allowing large dimension work pieces
- ASTM, ISO, JIS compliant
- ESELOAD unique motorised load application system, auto selection of main loads depending on HR scale (676 & 677 only)
- Superior depth measuring system through Heidenhain (Germany) transducer
- ESETOUCH advanced LCD touch screen & operator panel with user friendly menu operation in multiple languages
- High speed preload, loading and unloading procedure for ultra high efficiency
- ESELIFT (677 only) motorised elevating screw simplifies and speeds up test operation
- Automatic measurement procedure, load / dwell / unload (677 only)
- ESEMATIC fully automatic positioning and measuring procedure (positioning, preload, load, dwell, unload (676 and 677 models))
- Storage of 50 test programs and tester settings, allowing you to set up your tester in just seconds
- Alpha numerical data entry
- Continuous automatic "online" statistics, incl. average of readings etc.
- Storage of 99 single hardness values
- Go / No Go mode
- Convex and concave measuring mode
- Calibration date expired (reminder)
- Service mode including electronic linearity calibration, tests counter, maintenance system
- Prints statistics to built-in printer or external printer
- Built-in high speed printer and USB2 data output with network capability

The EW-675 ESETOUCH with manual load selection and manual elevator lead screw

EW-675 ESETOUCH	Manual load selection Manual elevator lead screw
EW-676 ESELOAD	Automatic load selection Manual elevator lead screw
EW-677 ESEMATIC	Automatic load selection Motorised elevator lead screw/Full automatic

Premium Twin Scale Rockwell Type Hardness Tester EW-670 Series

The EW-677 ESEMATIC model features, as standard, a fully automatic system for high speed production measurement

TECHNICAL SPECIFICATION

Rockwell scales	Standard	A,B,C,D,E,F,G,K,L,M,P,R,V
	Superficial	15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 15Y, 30Y, 45Y
Conversion to	HV, HB, other HR scales	
Hardness resolution	0.01 of a Rockwell unit	
Pre-load	3kgf / 10kgf	
Main loads	15, 30, 45, 60, 100, 150kg	
Pre-load application	Manual (automatic for 677 ESEMATIC)	
Test load application	Fully automatic	
Dwell time	0-99 seconds	
Data output	Built-in high speed printer & USB2	
LCD Display	Hardness value, conversion value, test force indicator, dwell time, memory contents, all machine settings, go / no go, all statistics	
Specimen accommodation	Vertical space 275mm Horizontal space (from centre of elevator shaft) 190mm	
Power supply	110-240V, 50-60Hz	
Machine dimensions	Approx. 940mm x 390mm x 670mm (HxWxD)	
Net weight	Approx. 140kg	

Standard Delivery

- Main unit
- Built-in thermal printer
- Data-output USB2
- USB cable
- Software
- Diamond Rockwell indenter
- Rockwell ball indenter 1/16"
- Spare balls 1/16" (5 pcs)
- Flat anvil ø 60mm
- Flat anvil ø 150mm
- V-anvil ø 40mm
- Hardness test blocks: ±60HRC, ±25HRC, ±85HRB, ±50HR30N, ±80HR30N, ±70HR30T
- Power cable
- Fuse 3A (2 pcs)
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- Machine cover
- ESEWAY® certificate
- Installation & users manual

Optional Accessories

- Clamping nose
- Certified test blocks
- Certified indenters & balls
- Pedestal spot anvil ø 10mm
- Special support system for large work pieces

Premium Closed Loop Rockwell Type Hardness Tester EW-6000 Series

High accuracy and repeatability through closed loop and load cell combined system

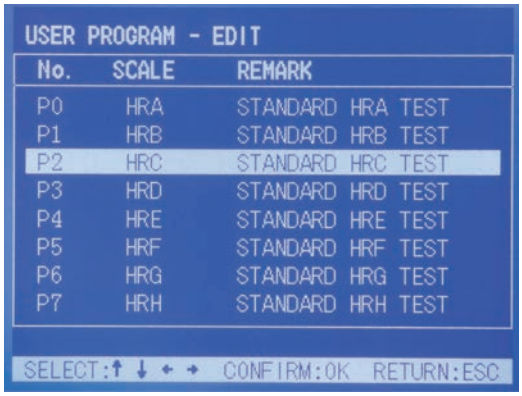
Features

- Measures Standard, Superficial or combined Rockwell hardness values
- Superior GR & R results!
- Simultaneous conversion to HV, HB and other HR scales
- Rugged fine casted frame allowing large dimension work pieces
- ASTM, ISO, JIS and other global standards compliant
- Unique closed loop and load cell combined system, guaranteeing that pre- and main loads are applied with absolute accuracy, no variation between testers and individual operators
- Superior depth measuring system through high precision Heidenhain (Germany) glass scale
- No elevating screw, simplifies test operation and enhances accuracy
- Storage of 50 test programs and tester settings, allowing you to set up your tester in just seconds
- Alpha numerical data entry
- Continuous automatic "online'' statistics, incl. average of readings etc.
- Storage of 99 single hardness values
- Go / No Go mode
- Convex and concave measuring mode
- Calibration date expired (reminder)
- Service mode including tests counter, maintenance system
- Prints statistics to built-in printer or external printer
- Built-in high speed printer and RS232 data output with network capability

The EW-6000 series model offers as standard a fully automatic system with the advantage of a fixed measuring table.

EW-6000 TR	Load cell / Closed loop Standard & Superficial Rockwell

Premium Closed Loop Rockwell Type Hardness Tester EW-6000 Series



TECHNICAL SPECIFICATION

Rockwell scales	Standard	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
	Superficial	15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y, HRBm, HRFm, HRX1 HRX2, HR30Tm
Conversion to	HV, HB, other HR scales	
Hardness resolution	0.1 of a Rockwell unit	
Pre-load	3kgf / 10kgf	
Main loads	15, 30, 45, 60, 100, 150kgf through controlled closed loop system	
Pre-load application	Fully automatic	
Test load application	Fully automatic	
Dwell time	0-99 seconds	
Data output	Built-in high speed printer & RS 232C	
LCD Display	Hardness value, conversion value, test force indicator, dwell time, memory contents, all machine settings, go / no go, all statistics, and many more	
Specimen accommodation	Vertical space 250mm Horizontal space (from centre of elevator shaft) 220mm	
Power supply	110-240V, 50-60Hz	
Machine dimensions	Approx. 940mm x 390mm x 670mm (HxWxD)	
Net weight	Approx. 120kg	

Standard Delivery

- Main unit
- Built-in printer
- Data-output RS-232C
- Diamond Rockwell indenter (UKAS)
- Rockwell ball indenter 1/16"
- Spare balls 1/16 (5 pcs)
- Flat testing anvil ø60mm
- Flat anvil ø150mm
- V-anvil ø40mm
- UKAS Hardness test blocks:
  ± 60 HRC, ±25 HRC, ±85 HRB
  ± 50 HR30N, ±80 HR30N,
  ±70 HR30T
- Power cable
- Fuse 3A (2 pcs)
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- ESEWAY® certificate
- User and installation manual

Optional Accessories

- Computer controlled auto traversing option
- Reference hardness blocks
- Certified indenters & balls
- Pedestal spot anvil
- Heavy load testing tables, flat anvil 200mm
- Clamping and indenter protection nose
- Special support systems for large workpieces
- Tester stand with cabinet

Rockwell Hardness Accessories

Selection of anvils for correct hardness testing

- To keep the test specimen stable and provide support, always use the smallest anvil possible
- When using test blocks, a pedestal spot anvil is recommended
- Always ensure that the anvil's top surface and its supporting contact surface are free of dirt, swarf, oil or corrosion
- If the indenter or other object has left a mark on the anvil test surface or seat, the anvil will cause false readings and should be replaced

Testing table large
The ø 150mm table is the most popular work support for large test specimens. The table is screwed onto the elevating screw. The vertical capacity will be reduced by about 25mm.

Flat anvil
The ø 63mm and ø 60mm flat anvil is used to support many flat specimens perpendicular to the indenter.

V-anvil
The standard V-anvil is used with cylindrical shaped rods or tubes of ø 6mm or larger.
(Not suitable for thin wall or soft tubing).

Pedestal spot anvil
The ø 5mm and ø 10mm spot anvil is used with small parts and sheet metal where not much support is required.
This anvil should be used with test blocks.

Clamping protection nose
Device to be mounted on indenter head, to keep the specimen in place by internal spring force, and to protect the indenter against collision.

Rockwell Hardness Scales

Scales, loads, indenters and applications

Regular Rockwell scales

Preliminary test force: 98.07N (10kgf)

Scale	Indenter	Test force		Applications
A	Diamond	588,4N	(60kgf)	Case hardened steel, cemented carbide, thin steel sheet, copper
D	Diamond	980,7N	(100kgf)	Case hardened steel, cemented carbide, thin steel sheet, copper
C	Diamond	1471N	(150kgf)	Case hardened steel, cemented carbide, thin steel sheet, copper
F	Steel ball diameter 1/16"	588.4N	(60kgf)	Annealed steel, bearing metal, hard-drawn aluminium alloys, brass, beryllium copper, phospor bronze
B	Steel ball diameter 1/16"	980.7N	(100kgf)	Annealed steel, bearing metal, hard-drawn aluminium alloys, brass, beryllium copper, phospor bronze
G	Steel ball diameter 1/16"	1471N	(150kgf)	Annealed steel, bearing metal, hard-drawn aluminium alloys, brass, beryllium copper, phospor bronze
H	Steel ball diameter 1/8"	588.4N	(60kgf)	Bearing metal, grinding stone
E	Steel ball diameter 1/8"	980.7N	(100kgf)	Bearing metal, grinding stone
K	Steel ball diameter 1/8"	1471N	(150kgf)	Bearing metal, grinding stone
P	Steel ball diameter 1/4"	588.4N	(60kgf)	Extra mild metal (e.g. aluminum, zinc, lead)
M	Steel ball diameter 1/4"	980.7N	(100kgf)	Extra mild metal (e.g. aluminum, zinc, lead)
L	Steel ball diameter 1/4"	1471N	(150kgf)	Extra mild metal (e.g. aluminum, zinc, lead)
R	Steel ball diameter 1/2"	588.4N	(60kgf)	Tin, plastics, cardboard
S	Steel ball diameter 1/2"	980.7N	(100kgf)	Tin, plastics, cardboard
V	Steel ball diameter 1/2"	1471N	(150kgf)	Tin, plastics, cardboard

Superficial Rockwell scales

Preliminary test force: 29.4N (3kgf)

Scale	Indenter	Test force		Applications
HR15N	Diamond 120°	147N	(15kgf)	Nitrided steel, thin steel plate, tubes and pipes, knife blade, small parts
HR30N	Diamond 120°	294N	(30kgf)	Nitrided steel, thin steel plate, tubes and pipes, knife blade, small parts
HR45N	Diamond 120°	441N	(45kgf)	Nitrided steel, thin steel plate, tubes and pipes, knife blade, small parts
HR15T	Steel ball diameter 1/16"	147N	(15kgf)	Soft steel, brass, bronze, tubes and pipes, aluminium alloy
HR30T	Steel ball diameter 1/16"	294N	(30kgf)	Soft steel, brass, bronze, tubes and pipes, aluminium alloy
HR45T	Steel ball diameter 1/16"	441N	(45kgf)	Soft steel, brass, bronze, tubes and pipes, aluminium alloy
HR15W	Steel ball diameter 1/8"	147N	(15kgf)	Soft steel, bismuth bronze
HR30W	Steel ball diameter 1/8"	294N	(30kgf)	Soft steel, bismuth bronze
HR45W	Steel ball diameter 1/8"	441N	(45kgf)	Soft steel, bismuth bronze
HR15X	Steel ball diameter 1/4"	147N	(15kgf)	Soft metal, plastics, etc.
HR30X	Steel ball diameter 1/4"	294N	(30kgf)	Soft metal, plastics, etc.
HR45X	Steel ball diameter 1/4"	441N	(45kgf)	Soft metal, plastics, etc.
HR15Y	Steel ball diameter 1/2"	147N	(15kgf)	Soft metal, plastics, etc.
HR30Y	Steel ball diameter 1/2"	294N	(30kgf)	Soft metal, plastics, etc.
HR45Y	Steel ball diameter 1/2"	441N	(45kgf)	Soft metal, plastics, etc.

Premium Closed Loop Micro/Macro Vickers, Knoop & Brinell Hardness Tester EW-4000 Series

High accuracy and repeatability through Closed Loop, Load Cell and Force Feedback system, 10 models available

High-end Vickers/Knoop/Brinell hardness testers with low and high force ranging from HV0.02 to HV50. The EW-4000 series features state of the art Closed Loop, Load Cell, and Force feedback technology for a reliable fast measurement procedure.

Modular design fits to almost any budget.

- Superior test control
- Superior accuracy
- Superior gauge repeatability and reproducibility
- Superior flexibility

Features

STAGES:

- Manual X-Y stage
- Motorised X-Y stage (optional)
- Motorised X-Y-Z stage (optional)
- IMP system with Video filar measuring and touch screen
- IMP system with auto focus and auto measuring level 5 (optional)

TURRET SYSTEM:

- Fully automatic 4 position turret for Micro Vickers / Macro Vickers, Brinell or Knoop measurements
- Featuring 3 objectives at choice, 5x, 10x, 20x or 10x, 20x, 40x. Optional 2nd indenter position

INDENTERS:

- Vickers 136°
- Knoop 172.5° x 130°
- Brinell 1 & 2.5mm

EYEPIECE:

- Electronic eyepiece microscope with precision encoder providing 15x magnification (10x eyepiece optional)

OBJECTIVES:

- 5x for 75x magnification
- 10x for 150x magnification
- 20x for 300x magnification
- 40x for 600x magnification

Available load configurations:

EW-4300	Vickers/Knoop	1kgf - 30kgf
EW-4301	Brinell	1kgf - 31.25kgf
EW-4302	Macro Vickers/Knoop	300gf - 30kgf
EW-4303	Micro/Macro Vickers/Knoop	20gf - 30kgf
EW-4304	Micro/Macro Vickers/Knoop/Brinell	20gf - 31.25kgf
EW-4500	Vickers/Knoop	1kgf - 50kgf
EW-4501	Brinell	1kgf - 62.5kgf
EW-4502	Macro Vickers/Knoop	300gf - 50kgf
EW-4503	Micro/Macro Vickers/Knoop	100gf - 50kgf
EW-4504	Micro/Macro Vickers/Knoop/Brinell	100gf - 62.5kgf

Premium Closed Loop Micro/Macro Vickers, Knoop & Brinell Hardness Tester EW-4000 Series

High accuracy and repeatability through Closed Loop, Load Cell and Force feedback system, 10 models available

TECHNICAL SPECIFICATION

EW-4300	1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30kgf
EW-4301	1 - 2 - 2.5 - 3 - 4 - 5 - 6.25 - 10 - 15.625 - 20 - 31.25kgf
EW-4302	0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30kgf
EW-4303	0.02 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 3 - 4 - 5 - 10 - 20 - 30kgf
EW-4304	As EW-4303 + additional 2.5 - 6.25 - 15.625 - 31.25kgf
EW-4500	1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30 - 50kgf
EW-4501	1 - 2 - 2.5 - 3 - 4 - 5 - 6.25 - 10 - 15.625 - 20 - 31.25 - 62.5kgf
EW-4502	0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30 - 50kgf
EW-4503	0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30 - 50kgf
EW-4504	As EW-4503 + additional 2.5 - 6.25 - 15.625 - 31.25 - 62.5kgf

Test force selection	Electronic, Closed Loop, Load Cell, Force feedback system, indication in kgf or N. Test force selectable over menu operation
Test procedure	Automatic, loading/dwell/unloading
Hardness value	5 digits
Loading speed	Variable, depending on load application
Turret	4 positions over 360°, fully automatic, memorised start position, option for 1 indenter and 3 objectives or 2 indenters and 2 objectives
Test force accuracy	< +/-1% for force from 100gr to 50kg, < +/-1,5% for force below 100gr
User display	Length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HV, HK and HB
Hardness conversion	Rockwell, Rockwell Superficial, Brinell, Leeb & Tensile
Standardisation	EN, ISO 6507, EN ISO 6506, EN ISO 4545, ASTM E-384, ASTM E-10-08, ASTM E-384
Statistics	Total test, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, light intensity, dwell time, print, clear, menu operation for date, time, scale and load settings, language
Firmware	V2.01, German, English, French (standard), V2.02, English, Italian, Spanish
Memory	Memory for batch testing results
Data output	RS-232 Bi-Directional
Loading mechanism	Fully automatic, Closed Loop, Force feedback, loading, dwell, unloading
Dwell time setting	Default 10 seconds, user defined 1 to 60 seconds
Printer	Built in, silent high speed thermal printer
Eyepiece microscope	Bright dual line filar eyepiece with 15x magnification, 0.01um reading
Light source	Halogen 12V, 30 watt, green filter, dimmable
Optical path	2 way, eyepiece / camera
Vertical capacity	160mm (maximum specimen height)
Horizontal capacity	135mm (from centre line)
Stage dimensions	100x100mm, travel 20x20mm, and reading 0.01mm
Operating temperature	5°C to 40°C (+/-20° for force 25gr and 50gr)
Humidity	10% to 90% non condensing
Dimensions	220 x 540 x 650mm
Weight	51Kg
Power	220V/110V, 50/60Hz, single phase

Standard Delivery

- Main unit
- Manual X-Y stage
- Flat anvil 60mm
- Digital eyepiece 15x
- Vickers test block (+/- 700 HV 10)*
- Vickers test block (+/- 700 HV 30)*
- Built in thermal printer
- Set of work piece fixtures, vice, clamp
- RS232 data output
- 4 adjustable feet
- Spare halogen lamp
- Installation & user manual
- Eseway quality certificate

Optional Accessories

- IMP video measuring systems
- Motorised X-Y stage
- Motorised X-Y-Z stage
- Indenters & test blocks
- Certified indenters & test blocks
- Solid tester table & storage cabinet
- Other clamping devices

*May vary depending on model

IMP Video Indent Measuring System - 4000 Series

VICKERS SYSTEM

Features

- High resolution USB video camera for crisp indent images
- Manual & automatic indent measuring mode (Optional)
- Indent ZOOM function for fit to screen indent magnification (Optional)
- Automatic illumination setting (Optional)
- Save, store and print files and images
- Report generator
- Data export to Excel or other MS applications
- Pattern programming, saving and recall (Optional)
- Return to position and re-measure (Optional)
- Variable distance point plotting

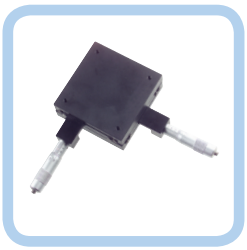


Table Option 1
Analogue stage micrometers

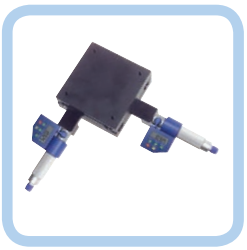


Table Option 2
Digital stage micrometers

Table Option 3
Small motorised stage

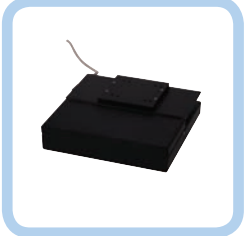


Table Option 4
Large motorised stage

IMP Video Indent Measuring System - 4000 Series

IMP-1

IMPRESSIONS XT V1.01 licence (CCD camera and C-mount included). Software for on screen measurement of Vickers / Knoop, LCD industrial DVI touch screen included.

IMP-2

IMPRESSIONS XT V1.01 licence, (for manual X-Y stage). (CCD camera and C-mount included). Software for manual and automatic measurement of Vickers / Knoop, Indent zoom function, automatic light adjustment, LCD industrial DVI touch screen included.

IMP-3

IMPRESSIONS XT V1.01 licence, (manual 1 axis digital X-Y stage). (CCD camera and C-mount included). Software for manual and automatic measurement of Vickers / Knoop, Indent zoom function, digital micrometer (1) on X-Y stage, automatic light adjustment, LCD industrial DVI touch screen included.

IMP-4

IMPRESSIONS XT V1.01 licence, (manual 2 axis digital X-Y stage). (CCD camera and C-mount included). Software for manual and automatic measurement of Vickers / Knoop, Indent zoom function, digital micrometers (2) on X-Y stage, automatic light adjustment, LCD industrial DVI touch screen included.

IMP-5V SEMI AUTOMATIC

IMPRESSIONS XT V1.01 licence, (motorised X-Y stage). (CCD camera and C-mount included). Software for manual and automatic measurement of Vickers / Knoop, Indent zoom function, automatic light adjustment, coordinate multi pattern testing module, motorised X-Y stage, LCD industrial DVI touch screen included, virtual mouse function.

IMP-6V FULLY AUTOMATIC

IMPRESSIONS XT V1.01 licence, (motorised X-Y stage and motorized Z-axis, auto focus). (CCD camera and C-mount included). Software for manual and fully automatic measurement of Vickers / Knoop, Indent zoom function, automatic indent focus, automatic light adjustment, coordinate multi pattern testing module, motorized X-Y stage, LCD industrial DVI touch screen included, virtual mouse function.

Automatic Measurement

Magnified, Fine Adjustment

Full Screen, Zoom

Report Generator

IMP-1	Indent measuring software, included CCD camera (see above specifications)
IMP-2	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)
IMP-3	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)
IMP-4	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)
IMP-5V	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)
IMP-6V	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)

Premium Micro-Vickers Hardness Tester EW-410AAT Series

Motorised turret with analogue measurement microscope and easy-to-use integrated hardness calculator

Features

- Two models available with 10gf - 1kgf or 10gf - 2kgf depending on model
- Fully automatic 4 position turret for Micro Vickers /Knoop measurements
  - Choice of turret configuration
  - 2 objectives and 1 indenter
  - Dual indenter (Vickers/Knoop) turret optional
- High resolution analogue eyepiece
- Built in high speed printer
- New user friendly display interface

Typical Applications

- Steels, nonferrous metals, IC wafers, small precision components
- Thin plastic, metallic foils, plating, coating, surface layers, laminated metals
- Effect of heat treatment, case depth analysis, depth of carburised and flame hardened layers

EW-412AAT	1kg analogue, 2 objectives

TECHNICAL SPECIFICATION - EUROPEAN MODEL

EW-412AAT	Analogue, 2 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1kgf (HV)
Test force selection	Manual
Test procedure	Automatic, loading/dwell/unloading
Hardness value	5 digits
Turret	4 positions over 360°, fully automatic, memorised start position, option for 2 indenters and 2 objectives or 1 indenter and 3 objectives
Test force accuracy	< +/-1% for force from 100gr to 2kg, < +/-1.5% for force below 100gr
User display	Length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HV, HK
Standardisation	EN, ISO 6507, ASTM E-384, EN 1S0 4545
Statistics	Total test, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, light intensity, dwell time, print, clear
Firmware	English
Memory	Memory for 10 test results, with CCD-VIEW software unlimited results
Data output	RS-232 Bi-Directional
Dwell time setting	Default 5 seconds, user defined 5 to 60 seconds (5 sec. increments)
Printer	Built in, silent high speed thermal printer
Eyepiece microscope	Bright dual line filar eyepiece with 15x magnification, 0.1um reading
Light source	Halogen 12V, 30W, green filter, dimmable
Optical path	2 way, eyepiece / camera
Vertical capacity	90mm (maximum specimen height)
Horizontal capacity	130mm (from centre line)
Stage dimensions	100x100mm, travel 25x25mm, and reading 0.01mm
Operating temperature	5°C to 40°C (+/-20° for force 25gr and 50gr)
Humidity	10% to 90% non condensing
Dimensions	420 x 250 x 490mm
Weight	37.5kg
Power	240V/110V, 50/60Hz, single phase

Contact sales@bowers-shanghai.com for more information with regard to Asia-specified machines.

Standard Delivery

- Main unit
- Manual X-Y stage
- Objectives according to model (10x & 40x)
- Analogue eyepiece 15x
- Vickers test block (+ / - 725 HV 1)
- Vickers test block (+ / - 450 HV 0.2)
- Built-in thermal printer
- RS-232 data output
- 4 adjustable feet
- Spare halogen bulb
- Fuse
- Installation & user's manual
- Eseway quality certificate

Optional Accessories

- Choice of objective configuration
- IMP Video measuring systems
- Dual indenter Vickers & Knoop
- Motorised X-Y stage
- Motorised X-Y-Z stage
- Set of work piece fixtures - vice, chuck & clamp
- Metal support table with storage cabinet
- Indenter & test blocks
- Certified indenter & test blocks

Optional System

- IMP system for semi and automatic traverses, pattern testing through PC support and motorised XY stage

Premium Micro-Vickers Hardness Tester EW-410DAT Series

Motorised turret with digital measurement microscope and easy-to-use integrated hardness calculator

Features

- Two models available with 10gf - 1 kgf or 10gf - 2kgf depending on model
- Fully automatic 4 position turret for Micro Vickers /Knoop measurements
  - Choice of turret configuration
  - 2 objectives and 1 indenter
  - Dual indenter (Vickers/Knoop) turret optional
- High resolution digital eyepiece
- Conversion to Rockwell, Rockwell Superficial, Brinell, Leeb & Tensile
- Built in high speed printer
- New user friendly display interface

Typical Applications

- Steels, nonferrous metals, IC wafers, small precision components
- Thin plastic, metallic foils, plating, coating, surface layers, laminated metals
- Effect of heat treatment, case depth analysis, depth of carburised and flame hardened layers

EW-412DAT	1kg digital, 2 objectives

TECHNICAL SPECIFICATION - EUROPEAN MODEL

EW-412DAT	Digital, 2 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1kgf (HV)
Test force selection	Manual
Test procedure	Automatic, loading/dwell/unloading
Hardness value	5 digits
Turret	4 positions over 360°, fully automatic, memorised start position, option for 2 indenters and 2 objectives or 1 indenter and 3 objectives
Test force accuracy	< +/-1% for force from 100gr to 2kg, < +/-1.5% for force below 100gr
User display	Length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HV, HK
Hardness conversion	Rockwell, Rockwell Superficial, Brinell, Leeb & Tensile
Standardisation	EN, ISO 6507, EN ISO 4545, ASTM E-384
Statistics	Total test, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, light intensity, dwell time, print, clear, menu operation for date, time, scale and load settings, language
Firmware	German, English, French (standard)
Memory	Memory for 10 test results, with CCD-VIEW software unlimited results
Data output	RS-232 Bi-Directional
Dwell time setting	Default 5 seconds, user defined 5 to 60 seconds (5 sec. increments)
Printer	Built in, silent high speed thermal printer
Eyepiece microscope	Bright dual line filar eyepiece with 15x magnification, 0.1um reading
Light source	Halogen 12V, 30W, green filter, dimmable
Optical path	2 way, eyepiece / camera
Vertical capacity	90mm (maximum specimen height)
Horizontal capacity	130mm (from centre line)
Stage dimensions	100x100mm, travel 25x25mm, and reading 0.01mm
Operating temperature	5°C to 40°C (+/-20° for force 25gr and 50gr)
Humidity	10% to 90% non condensing
Dimensions	420 x 250 x 490mm
Weight	37.5kg
Power	240V/110V, 50/60Hz, single phase

Contact sales@bowers-shanghai.com for more information with regard to Asia-specified machines.

Standard Delivery

- Main unit
- Manual X-Y stage
- Objectives according to model (10x & 40x)
- Digital eyepiece 15x
- Vickers test block (+ / - 725 HV 1)
- Vickers test block (+ / - 450 HV 0.2)
- Built-in thermal printer
- RS-232 data output
- 4 adjustable feet
- Spare halogen bulb
- Fuse
- Installation & users manual
- Eseway quality certificate

Optional Accessories

- Choice of objective configuration
- IMP Video measuring systems
- Dual indenter Vickers & Knoop
- Motorised X-Y stage
- Motorised X-Y-Z stage
- Set of work piece fixtures - vice, chuck & clamp
- Metal support table with storage cabinet
- Indenter & test blocks
- Certified indenter & test blocks

Optional System

- IMP system for semi and automatic traverses, pattern testing through PC support and motorised XY stage

Premium Micro-Vickers Hardness Tester EW-420AAT Series

Motorised turret with analogue measurement microscope and easy-to-use integrated hardness calculator

Features

- Two models available with 10gf - 1 kgf or 10gf - 2kgf depending on model
- Fully automatic 4 position turret for Micro Vickers /Knoop measurements
  - Choice of turret configuration
  - 2 objectives and 1 indenter
  - Dual indenter (Vickers/Knoop) turret optional
- High resolution analogue eyepiece
- Built in high speed printer
- New user friendly display interface

Typical applications

- Steels, nonferrous metals, IC wafers, small precision components
- Thin plastic, metallic foils, plating, coating, surface layers, laminated metals
- Effect of heat treatment, case depth analysis, depth of carburised and flame hardened layers

EW-422AAT	2kg analogue, 2 objectives

TECHNICAL SPECIFICATION - EUROPEAN MODEL

EW-422AAT	Analogue, 2 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2kgf (HV)
Test force selection	Manual
Test procedure	Automatic, loading/dwell/unloading
Hardness value	5 digits
Turret	4 positions over 360°, fully automatic, memorised start position, option for 2 indenters and 2 objectives or 1 indenter and 3 objectives
Test force accuracy	< +/-1% for force from 100gr to 2kg, < +/-1.5% for force below 100gr
User display	Length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HV, HK
Standardisation	EN, ISO 6507, ASTM E-384, EN ISO 4545
Statistics	Total test, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, light intensity, dwell time, print, clear
Firmware	English
Memory	Memory for 10 test results, with CCD-VIEW software unlimited results
Data output	RS-232 Bi-Directional
Dwell time setting	Default 5 seconds, user defined 5 to 60 seconds (5 sec. increments)
Printer	Built in, silent high speed thermal printer
Eyepiece microscope	Bright dual line filar eyepiece with 15x magnification, 0.1um reading
Light source	Halogen 12V, 30W, green filter, dimmable
Optical path	2 way, eyepiece / camera
Vertical capacity	90mm (maximum specimen height)
Horizontal capacity	130mm (from centre line)
Stage dimensions	100x100mm, travel 25x25mm, and reading 0.01mm
Operating temperature	5°C to 40°C (+/-20° for force 25gr and 50gr)
Humidity	10% to 90% non condensing
Dimensions	420 x 250 x 490mm
Weight	37.5kg
Power	240V/110V, 50/60Hz, single phase

Contact sales@bowers-shanghai.com for more information with regard to Asia-specified machines.

Standard Delivery

- Main unit
- Manual X-Y stage
- Objectives according to model (10x & 40x)
- Analogue eyepiece 15x
- Vickers test block (+ / - 725 HV 1)
- Vickers test block (+ / - 450 HV 0.2)
- Built-in thermal printer
- RS-232 data output
- 4 adjustable feet
- Spare halogen bulb
- Fuse
- Installation & user's manual
- Eseway quality certificate

Optional Accessories

- Choice of objective configuration
- IMP Video measuring systems
- Dual indenter Vickers & Knoop
- Motorised X-Y stage
- Motorised X-Y-Z stage
- Set of work piece fixtures - vice, chuck & clamp
- Metal support table with storage cabinet
- Indenter & test blocks
- Certified indenter & test blocks

Optional System

- IMP system for semi and automatic traverses, pattern testing through PC support and motorised XY stage

Premium Micro-Vickers Hardness Tester EW-420DAT Series

Motorised turret with digital measurement microscope and easy-to-use integrated hardness calculator

Features

- Two models available with 10gf - 1 kgf or 10gf - 2kgf depending on model
- Fully automatic 4 position turret for Micro Vickers /Knoop measurements
  - Choice of turret configuration
  - 2 objectives and 1 indenter
  - Dual indenter (Vickers/Knoop) turret optional
- High resolution Digital eyepiece
- Conversion to Rockwell, Rockwell Superficial, Brinell, Leeb & Tensile
- Built in high speed printer
- New user friendly display interface

Typical Applications

- Steels, nonferrous metals, IC wafers, small precision components
- Thin plastic, metallic foils, plating, coating, surface layers, laminated metals
- Effect of heat treatment, case depth analysis, depth of carburised and flame hardened layers

EW-422DAT	2kg digital, 2 objectives

TECHNICAL SPECIFICATION - EUROPEAN MODEL

EW-422DAT	Digital, 2 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2kgf (HV)
Test force selection	Manual
Test procedure	Automatic, loading/dwell/unloading
Hardness value	5 digits
Turret	4 positions over 360°, fully automatic, memorised start position, option for 2 indenters and 2 objectives or 1 indenter and 3 objectives
Test force accuracy	< +/-1% for force from 100gr to 2kg, < +/-1.5% for force below 100gr
User display	Length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HV, HK
Hardness conversion	Rockwell, Rockwell Superficial, Brinell, Leeb & Tensile
Standardisation	EN, ISO 6507, EN ISO 4545, ASTM E-384
Statistics	Total test, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, light intensity, dwell time, print, clear, menu operation for date, time, scale and load settings, language
Firmware	German, English, French (standard)
Memory	Memory for 10 test results, with CCD-VIEW software unlimited results
Data output	RS-232 Bi-Directional
Dwell time setting	Default 5 seconds, user defined 5 to 60 seconds (5 sec. increments)
Printer	Built in, silent high speed thermal printer
Eyepiece microscope	Bright dual line filar eyepiece with 15x magnification, 0.1um reading
Light source	Halogen 12V, 30W, green filter, dimmable
Optical path	2 way, eyepiece / camera
Vertical capacity	90mm (maximum specimen height)
Horizontal capacity	130mm (from centre line)
Stage dimensions	100x100mm, travel 25x25mm, and reading 0.01mm
Operating temperature	5°C to 40°C (+/-20° for force 25gr and 50gr)
Humidity	10% to 90% non condensing
Dimensions	420 x 250 x 490mm
Weight	37.5kg
Power	240V/110V, 50/60Hz, single phase

Contact sales@bowers-shanghai.com for more information with regard to Asia-specified machines.

Standard Delivery

- Main unit
- Manual X-Y stage
- Objectives according to model (10x & 40x)
- Digital eyepiece 15x
- Vickers test block (+ / - 725 HV 1)
- Vickers test block (+ / - 450 HV 0.2)
- Built-in thermal printer
- RS-232 data output
- 4 adjustable feet
- Spare halogen bulb
- Fuse
- Installation & users manual
- Eseway quality certificate

Optional Accessories

- Choice of objective configuration
- IMP Video measuring systems
- Dual indenter Vickers & Knoop
- Motorised X-Y stage
- Motorised X-Y-Z stage
- Set of work piece fixtures - vice, chuck & clamp
- Metal support table with storage cabinet
- Indenter & test blocks
- Certified indenter & test blocks

Optional System

- IMP system for semi and automatic traverses, pattern testing through PC support and motorised XY stage

IMP Video Indent Measuring System - 400 Series

MICRO-VICKERS SYSTEM

Features

- High resolution USB video camera for crisp indent images
- Manual & automatic indent measuring mode (Optional)
- Indent ZOOM function for fit to screen indent magnification (Optional)
- Automatic illumination setting (Optional)
- Save, store and print files and images
- Report generator
- Data export to Excel or other MS applications
- Pattern programming, saving and recall (Optional)
- Return to position and re-measure (Optional)
- Variable distance point plotting

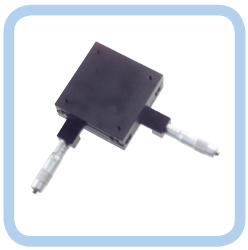


Table Option 1
Analogue stage micrometers

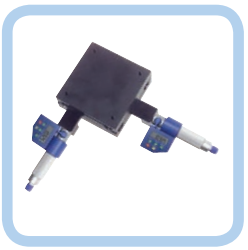


Table Option 2
Digital stage micrometers

Table Option 3
Small motorised stage

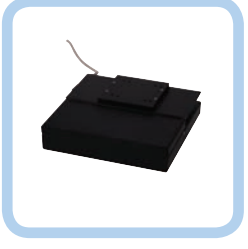


Table Option 4
Large motorised stage

IMP Video Indent Measuring System - 400 Series

IMP-1

IMPRESSIONS XT V1.01 licence (CCD camera and C-mount included). Software for on screen measurement of Vickers / Knoop, LCD industrial DVI touch screen included.

IMP-2

IMPRESSIONS XT V1.01 licence, (for manual X-Y stage). (CCD camera and C-mount included). Software for manual and automatic measurement of Vickers / Knoop, Indent zoom function, automatic light adjustment, LCD industrial DVI touch screen included.

IMP-3

IMPRESSIONS XT V1.01 licence, (manual 1 axis digital X-Y stage). (CCD camera and C-mount included). Software for manual and automatic measurement of Vickers / Knoop, Indent zoom function, digital micrometer (1) on X-Y stage, automatic light adjustment, LCD industrial DVI touch screen included.

IMP-4

IMPRESSIONS XT V1.01 licence, (manual 2 axis digital X-Y stage). (CCD camera and C-mount included). Software for manual and automatic measurement of Vickers / Knoop, Indent zoom function, digital micrometers (2) on X-Y stage, automatic light adjustment, LCD industrial DVI touch screen included.

IMP-5MV SEMI AUTOMATIC

IMPRESSIONS XT V1.01 licence, (motorised X-Y stage). (CCD camera and C-mount included). Software for manual and automatic measurement of Vickers / Knoop, Indent zoom function, automatic light adjustment, coordinate multi pattern testing module, motorised X-Y stage, LCD industrial DVI touch screen included, virtual mouse function.

IMP-6MV FULLY AUTOMATIC

IMPRESSIONS XT V1.01 licence, (motorised X-Y stage and motorized Z-axis, auto focus). (CCD camera and C-mount included). Software for manual and fully automatic measurement of Vickers / Knoop, Indent zoom function, automatic indent focus, automatic light adjustment, coordinate multi pattern testing module, motorized X-Y stage, LCD industrial DVI touch screen included, virtual mouse function.

Automatic Measurement

Magnified, Fine Adjustment

Full Screen, Zoom

Report Generator

IMP-1	Indent measuring software, included CCD camera (see above specifications)
IMP-2	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)
IMP-3	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)
IMP-4	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)
IMP-5MV	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)
IMP-6MV	Indent measuring software, included CCD camera and DVI touch screen (see above specifications)

Brinell Hardness Tester CV-3000LDB

Ready-to-test digital Brinell tester with closed loop controlled load application

Features

- Sturdy, regular 3000kg Brinell tester
- Rugged construction to withstand the harshest environments
- Accurate reliable and durable tester at a very affordable price
- High rigidity and closed loop load technology to ensure accurate and safe load application
- External microscope with analogue scale for indentation measurement
- Easy to use human interface to set up and operate the tester
- Brinell video microscope system optional

TECHNICAL SPECIFICATION

Brinell scales	HBW 10/3000, HBW 10/1500, HBW 10/1000, HBW 10/500, HBW 10/250, HBW 10/125, HBW 10/100, HBW 5/750, HBW 5/250, HBW 5/62.5, HBW 2.5/187.5
Test loads	62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000kgf
Display indication	Test force selected, test force actual, dwell time
Test force application	Closed loop controlled load motor
Load duration	Adjustable application and dwell time 5-60 sec (5 sec step)
Accuracy	Conforms to EN-ISO 6506
Specimen accommodation	Vertical space 220mm Horizontal space (from centre-line) 135mm
Specimen access	External surfaces roughly ground, Ra <21.6µm
Power supply	220V/50Hz or 110V/60Hz
Measuring microscope	Magnification 20X, resolution 5µm
Machine dimensions	Width 236mm, depth 550mm, height 753mm
Machine weight	Approx. 123kg

Standard Delivery

- CV-3000LDB main unit
- Measuring microscope 20x
- Ball indenters
  ø 2.5mm, ø 5mm and ø 10mm
- V-anvil ø80mm
- Large flat anvil ø200mm
- Small flat anvil ø80mm
- Test block 150-250 HBW 10/3000
- Test block 75-125 HBW 10/1000
- Test block 150-250 HBW 2.5/187.5
- Fuse 2A (3 pcs)
- CV Instruments certificate
- Installation and user manual

Optional Accessories

- Spare balls for each indenter
- Brinell video microscope system

Brinell Scanning System CV-HB100

Portable Brinell video scanning system

Features

- High end portable video scanning system to automatically measure and determine the Brinell hardness value
- Excellent solution for quick and easy measurement of Brinell hardness values with ball diameters 1, 2, 2.5, 5 and 10mm and applied loads of 1 to 3000kg
- Including magnetic base for accurate and precise measuring
- Easy to use: Position the scanning system on the indentation made in a flat or curved surface, take an image of the indentation and send the image to pc or laptop to determine the relative hardness and diameter of the indentation. Accuracy of the measured diameter is up to 0.001µm
- Possibility to set tolerance value Yes/No
- Possibility to show the last 5 hardness measurements taken
- Automatic storage of images and files
- Storage of operator ID, date/hour, hardness parameters, measured hardness values, location of stored image
- Software for automatic measurement can be used for numerous other applications with different video cameras

Software Features

- Measures the indentation automatically or by hand
- Saves the image of the indentation in a dedicated format and folder
- Test results can be imported into Excel
- Each measurement is filed with information about the ball diameter, applied load, load duration
- Images taken can be copied

PC Requirements

- Processor: Intel Pentium or equivalent 1GHz
- Operating system: Windows 2000 or Windows XP
- Browser: Internet Explorer 5.5 (or higher)
- Memory: 512Mb RAM
- Minimum disk space: 4Mb
- Video card: 32Mb
- Firewire port

Standard Delivery

- Video-optical head
- Software
- Power supply AC 100-240V, 50/60Hz, 1.0A
- Frame grabber
- Video cable (2.3m)
- RCA-RCA video cable (1.5m)
- Set of USB cable, CD with driver & dongle

TECHNICAL SPECIFICATION

Power supply	110V to 240V
Power consumption	300mA
Dimensions	ø 43mm x 270mm
Dimensions carrying case	Ext. 380mm x 265mm x150mm
	Int. 350mm x 250mm x140mm
Weight	650gr

Optional Accessories

- Battery charger 12V, 7A
- Battery charger 12V, 1.2A
- Aluminium carrying case for CV-HB100
- PC or laptop

Brinell Hardness Tester EW-3000 Series

High end Brinell & Vickers testing in one machine. German-made optical system with high quality objectives and either analogue or digital reading microscopes. Conversion to other hardness scales and real-time statistics. Connectivity for data output via RS-232

EW-3001
with Analogue Microscope

EW-3000 XL Series
Motorised Spindle

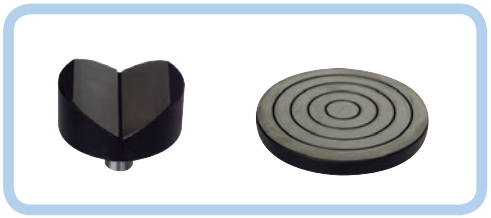
EW-3001 XLM-IMP
Automatic Measurement

Features

- Load cell, closed loop system
- Test loads 30kgf - 3000kgf
- LCD display showing Brinell and Vickers value, statistics and tester settings
- Simultaneous conversion to Rockwell, Vickers, Brinell and Leeb rebound testing
- Microscope with analogue scale for indentation measurement (EW-3001 model)
- Digital microscope for automatic indentation measurement (EW-3002 model)
- Standard supplied with objectives for 10x, 25x and 100x magnification
- Brinell video microscope system (optional)
- Brinell IMP-IMPRESSIONS automatic indent measuring and filing system

- **XL version, 450mm workpiece height, 250mm throat depth**

Brinell Hardness Tester EW-3000 Series



EW-3001	Brinell, analogue micrometer reading
EW-3001XL	Brinell, analogue micrometer reading, tall version
EW-3001XLM-IMP	IMP Brinell, Vickers automatic measuring system
EW-3002	Brinell, Vickers, digital microscope
EW-3002XL	Brinell, Vickers digital microscope, tall version

TECHNICAL SPECIFICATION

Brinell scale HB	31.25, 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000kgf
Vickers HV	30, 40, 50, 60, 80, 100, 120kgf
Ball indenters	10, 5, 2.5, 1mm
Test force selection	Electronic, closed loop, load cell, force feedback system, indication in kgf or N
Test procedure	Automatic, loading/dwell/unloading
Loading speed	Variable, depending on load application
Test force accuracy	< 1% full range
User display	Diameter of indent, length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HB, HV
Hardness conversion	Rockwell, Vickers, Brinell, Leeb & Tensile 2 scales simultaneously
Standardisation	N, ISO 6507, EN ISO 6506, ASTM E-10-08, ASTM E-92
Statistics	Total tests, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, dwell time, print, clear, menu operation for date, time, scale, and load settings, language
Firmware	German, English, French (standard)
Memory	Large memory for testing results
Data output	RS-232, Bi-Directional
Loading mechanism	Fully automatic, closed loop, force feedback, loading, dwell, unloading
Dwell time setting	Default 10 seconds, user defined 1 to 99 seconds
Eyepiece microscope	Analogue or optional bright dual line filar
Vertical capacity	220mm (450mm XL model)
Horizontal capacity	135mm (250mm XL model) from center-line
Humidity	10% to 90% non condensing
Machine weight	130kg (160kg XL model)
Power requirements	100VAC to 240VAC, 50/60Hz, single phase
Power consumption	390W
Guarantee	1 year guarantee

Standard Delivery

- Analogue microscope with 20x magnification (EW-3001)
- Digital microscope with 10x, 25x and 100x magnification (EW-3002) for automatic measurement
- Ball indenters ø 1mm, ø2.5mm, ø5mm and ø10mm
- V-anvil ø80mm
- Large flat anvil ø 200mm
- Fuse 2A (3 pcs)
- Hardness test block 150-250 HBW 10/3000
- Hardness test block 75-125 HBW 10/1000
- Hardness test block 150-250 HBW 2.5/187.5
- RS-232 data output
- 4 adjustable feet
- ESEWAY® certificate
- Installation and user manual

Optional Accessories

- Motorised spindle for fully automatic testing on XL models
- Large testing table 350mm x 250mm
- HB100 Video measuring and database system
- Extended height/width frame XL models
- Motorised X-Y stage
- Indenters & hardness test blocks
- Certified indenters & blocks
- Solid tester table & storage cabinet

IMP-Impressions

High performance PC- based camera indent measuring system. Automatic measurement of the indent on the LCD screen. Store, file, handle images and data on the hard disk

Portable Brinell Hardness Tester HB120

The **Portable Brinell Hardness Tester** is a lightweight, full load (3000kg) instrument capable of accurately testing a large variety of metal specimens. The tester's portability allows it to be used in any plane, conventionally for full load (3000kg), in-situ Brinell testing of large components

Features

- Permanence — Impression can be checked and rechecked anytime
- Accuracy — Calibrated to 0.5 of 1% of load;
  Can be used for higher loads up to 3000kg;
  Breaks through surface heat treatment to get to the core of the material
- Versatility — Can be used in virtually any position; right-side up, upside down or sideways
- Durability — Some portable Brinell testers have been working over 60 years

Portable Brinell Hardness Tester HB120

- **Standard test head**
  Calibrated accurate to ½ of 1% load.
  Releases at 3000kg automatically.
  Capable of incremental loads

- **Standard test head with long ram**
  Same features as standard test head plus a long ram that puts impression head at end of 2" extension for easy access into recessed areas or over raised edges

- **Low pressure test head**
  Applied load and indicator dial are coordinated for softer metals.
  Can be calibrated to release at loads of 62-½kg, 125kg, 250kg, 500kg, or 1000kg

- **Low pressure test head with long ram**
  Same features as low pressure test head plus a long ram that puts impression head at end of 2" extension for easy access into recessed areas or over raised edges

- **Adapter to hold test head upright without base**
  For testing large flats it enables test heads to be used under large drill presses, boring mills, arbor presses and beams that are capable of withstanding 3000kg load

- **Chain adapter**
  Used for large cylinders it fits onto a standard test head and wraps around specimens that are too big for regular tester. High strength chrome/molybdenum steel arms hold the chain to the test head and allow it to stay rigid while the chain takes the full thrust of the load. Supplied with 4" chain

- **Base**
  14" base with 14" test height opening and 4" throat is standard. Optional 6" throat with either 14" or 20" test height opening available, 20" base also available with 4" throat and 20" test height opening

- **2.5mm and 5mm ball adapter**
  Used on softer materials or where a smaller impression is desired

- **Stage micrometer**
  Used to check calibration of Brinell Microscope by placing the microscope on the stage micrometer and aligning the grid on the stage micrometer with the grid on the microscope. If the grids do not match perfectly, the microscope is out of calibration and should be re-calibrated. Meets ASTM50, and is traceable to NIST standards

- **Brinell microscope**
  Constructed from stainless steel, the rugged and optically reliable Brinell microscope is the most versatile on the market today. Featuring a 20x pre-focused lens, the microscope has a narrow nosepiece which easily fits into tight recesses, resulting in less grinding on castings, billets and dies. For added stability when performing flat work, a slip-on base adapter is included. A side opening in the microscope allows plenty of natural light for viewing, and a cordless movable pen light can be used in dim conditions. Calibrated on equipment traceable to NIST standards, the Brinell microscope meets ASTM 5-10 specifications. It is ready to use and comes equipped with a handy storage case

Universal Hardness Tester CV-700

Rockwell, Vickers, Brinell, traditional dead weight hardness tester with an analogue Rockwell scale and analogue microscope readings. Ideal for use in education or general metal working workshops. **Limited test loads ranging between 31.25kgf and 187.5kgf**

Features

- Dead-weight universal hardness tester with solid design
- Rockwell, Brinell and Vickers testing procedures combined in one tester
- Sliding table between indenter and measuring microscope
- Magnification by 3 objective lenses giving up to 150x magnification (optional)
- Conforms to DIN-EN-ISO 6506, 6507, 6508 and ASTM
- Simple test cycle by operation lever
- Test load range up to 187.5kgf
- Elevating spindle with precision guide bush, high precision bearings to eliminate back-lash from the system

Universal Hardness Tester CV-700

TECHNICAL SPECIFICATION

Hardness parameters	Rockwell, Brinell, Vickers	
Optics	Eyepiece magnification 15x	
Objectives	2.5x for 37.5x magnification, 5x for 75x magnification and 10x for 150x magnification (optional)	
Standards	Conforms to DIN-EN-ISO 6506, 6507, 6508 and ASTM	
Test load type	Dead weight via load selector	
Test cycle	Manually operated	
Test loads	Rockwell Brinell Vickers	60, 100, 150kg 31.25, 62.5, 187.5kg 30 & 100kg
Indenter types optional	Rockwell Brinell Vickers	Diamond cone 120°, Balls 1/16" Balls 2.5-5mm Diamond cone 136°
Load duration	Conforms to standards	
Data output	Non	
Specimen accommodation	Maximum test height 180mm, maximum depth 200mm (from the center)	
Specimen access	External surfaces, Cylindrical surfaces down to 3mm diameter	
Power supply	220V/50Hz	
Machine dimensions	Width 560mm, depth 260mm, height 760mm	
Machine net weight	90kg	

Standard Delivery

- Objectives for 37.5x and 75x magnification
- Sliding testing table
- V-anvil ø40mm and ø60mm
- Flat anvil ø60mm
- Testing table ø160mm
- Hardness test block ±450HV
- Hardness test block ±200HB
- Hardness test block ±60HRC
- Hardness test block ±25HRC
- Hardness test block ±85HRB
- Rockwell diamond cone 120°
- Rockwell ball indenters 1/16"
- Brinell ball indenters 1mm, 2.5mm, 5mm
- Vickers diamond cone 136°
- Fuse 7A (2 pcs)
- Spare light bulb 6V/15W (2 pcs)
- External light source for improved Brinell indent viewing
- Power cable
- CV Instruments certificate
- Installation and user manual

Optional Accessories

- Objective for 150x magnification
- Dual filar microscope
- LED ring light
- Certified indenters & balls
- Reference hardness blocks

Universal Hardness Tester ESEWAY 700 Series

The ESEWAY 700 series is a new generation of hardness testing machines. Featuring closed loop system based on a precision load cell, guarantees the best GR & R results ever seen on Universal hardness testers. Test forces ranging from 1 to 250kgf.

ESEWAY 700 AS

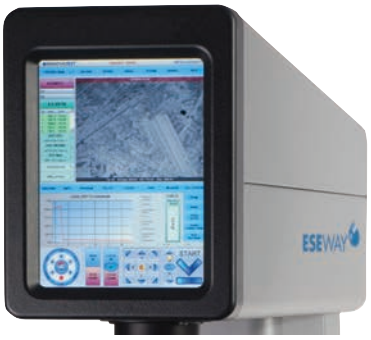
ESEWAY 750LCD

Features

- Load cell, force feedback, closed loop system
- Unparalleled rigidity
- Unmatched GR & R results
- Load range 1kgf up to 250kgf depending on model
- Complies to all applicable EN/ISO, ASTM and JIS standards
- Shape correction settings for curved surfaces
- Optical depth measuring system (Rockwell, HBT, HVT, Hb)
- Powerful Embedded PC with 2 hard disks and HD industrial touch screen (ESEWAY 750 models)
- IMPRESSIONS high end video based hardness testing firmware including CCD camera, automatic indent measurement, indent ZOOM system, conversion to other hardness scales, test data & image storage, statistic results storage, Jominy stage operation, X-Y stage operation (ESEWAY 750 models)
- OLED full colour user-friendly interface, easy to operate (ESEWAY 700 RS, RSB, AS models)
- Go / No Go function with visual and acoustic warning (ESEWAY 700 RS, RSB, AS models)
- Large memory for measurements with statistic results (ESEWAY 700 RS, RSB, AS models)
- Easy calibration function
- Testing program storage
- Standard nose cone clamping attachment
- Printer & USB-2 output (ESEWAY 700 RS, RSB, AS models)
- External Brinell microscope with LED ring light (RSB model)
- Built on Vickers / Brinell microscope with LED ring light (AS, CCD models)
- Work piece sliding table (AS, CCD models)
- Large work piece accommodation
- Motorised spindle (Optional)

Universal Hardness Tester ESEWAY 700 Series

ESEWAY 700 AS



ESEWAY 750LCD

EW-700-RS	Rockwell, Superficial Rockwell, HVT, HBT, Hb, Plastic ISO 2039/1
EW-700-RSB	Rockwell, Superficial Rockwell, Brinell, HVT, HBT, Hb, Plastic ISO 2039/1
EW-700-AS	Rockwell, Superficial Rockwell, Brinell, Vickers, HVT, HBT, Hb, Plastic ISO 2039/1
EW-750-LCD	Rockwell, Superficial Rockwell, HVT, HBT, Hb, Plastic ISO 2039/1
EW-750-CCD	Rockwell, Superficial Rockwell, Brinell, Vickers, HVT, HBT, Hb, Plastic ISO 2039/1

TECHNICAL SPECIFICATION

Load application	Load cell, force feedback, closed loop system
Hardness scales (RS)	Rockwell / Superficial Rockwell, HVT, HBT, Hb
Hardness scales (RSB)	Rockwell / Superficial Rockwell, Brinell, HVT, HBT, Hb
Hardness scales (AS)	Rockwell / Superficial Rockwell, Brinell, Vickers, HVT, HBT, Hb
Hardness scales (LCD)	Rockwell / Superficial Rockwell, HVT, HBT, Hb
Hardness scales (CCD)	Rockwell / Superficial Rockwell, Brinell, Vickers, HVT, HBT, Hb
Load range (RS)	1kgf to 187.5kgf
Load range (RSB/AS)	1kgf to 250kgf
Load range (LCD)	1kgf to 187.5kgf
Load range (CCD)	1kgf to 250kgf
Test loads	1, 2, 2.5, 3, 5, 10, 15, 15.625, 20, 30, 31.25, 45, 50, 60, 62.5, 100, 125,150, 187.5, 250kgf depending on model
Vickers test range	HV1, HV 2, 3, 5, 10, 20, 30, 50, 100, 120kgf; HVT 50, 100kgf
Brinell test range	HB1/2.5, 5, 10, 31.25kgf; HB2.5/6.25, 15.625, 31.25, 62.5, 187.5kgf; HB5/25, 62.5, 125kgf; HB10/100kgf; HBT2.5/62.5, 187.5kgf
Rockwell scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
Rockwell superficial scales	15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Optical system (RS)	None
Optical system (RSB)	External Brinell microscope with LED ring light
Optical system (AS)	Built on electronic microscope with 3 objectives and LED ring light
Optical system (LCD)	None
Optical system (CCD)	High resolution 5Mp video camera mounted on built on Microscope
Objectives (AS, CCD)	Interchangeable 2.5x, 5x and 10x magnification with LED ring light (CCD)
Eyepiece (AS, LCD)	10x magnification (15x optional)
Scale resolution (depth)	0.1 micron
Display (RS, RSB, AS)	Full colour OLED display, testing results, statistics, built-in hardness calculator, program overview, settings, calibration and many more
Display (LCD, CCD)	Large high definition industrial touch screen can also be operated by mouse and keyboard
Standards	Complies to, or exceeds, EN/ISO, ASTM and JIS
Test cycles	Fully automatic, Load, Dwell, Unload
Force control	1-99 seconds
Data output	USB-2, RS-232 (RS, RSB, AS) RJ-45 LAN,W-LAN (LCD, CCD)
Specimen accommodation	Height 300mm Throat 200mm

Standard Delivery

- Brinell microscope with LED ring light for dark field illumination (AS, RSB, CCD)
- Objectives for 37.5x, 75x and 150x magnification (AS, CCD)
- Sliding testing table (AS, CCD)
- Flat anvil, hardened, ø60mm
- Testing table, hardened, ø180mm
- V-anvil hardened ø40mm
- Fuse 3A slow (2 pcs)
- Power cable
- Eseway certificate
- Installation and user manual

Optional Accessories

- Knoop hardness testing scale (CCD)
- V-Anvil 60mm
- Certified indenters
- Certified or factory reference hardness blocks
- Long indenters
- Goose neck indenter holder
- Large testing table 300 x 200mm with T-slot
- Custom testing tables
- Precision vices, V-blocks and special clamps

Universal Hardness Tester EW-7000 Series

Rockwell, Vickers, Knoop, Brinell, HVT, HBT Load cell, closed loop, force feedback system. Advanced digital system, digital readings, memory and conversion to other hardness scales. Matt screen for Vickers and Brinell indents. Large workpiece accommodation in the range of test loads starting at 1kgf to 250kgf

EW-7000
Digital Matt Screen

EW-7000XL
Digital Matt Screen, Large Frame

Features

- Load cell, force feedback, closed loop system
- Wide test load range up to 250kgf
- Complies with all applicable EN/ISO and ASTM standards
- Shape correction values for curved surfaces
- High-quality depth measuring system (Rockwell, HBT, HVT)
- User-friendly, low training requirements
- Possibility to store 20 batch files with 50 measuring results each
- Direct printer and/or PC connections via RS-232 and USB-2

Suitable to determine the hardness of castings and forgings, meets a wide variety of applications within the automotive and aerospace industry

Universal Hardness Tester EW-7000 Series

EW-7000XL
Digital Matt Screen, Large Frame

EW-7000	Universal hardness tester, standard
EW-7000XL	Universal hardness tester, extended work height

TECHNICAL SPECIFICATION

Hardness scales	Brinell, Vickers, Rockwell (HVT & HBT)
Load application	Load cell, force feed back, closed loop system
Load range	1-250kgf
Optical system	High precision optical path, screen diameter 135mm
Objectives	Interchangeable 20x, 44x, 70x, 140x magnification
Scale Resolution	0.001mm (1 micron)
Display	Full function LCD screen, testing results, statistics, built-in hardness calculator, etc.
Standards	Complies to all applicable EN/ISO and ASTM standards
Test loads	(0.5*) 1, 2, 2.5, 3, 5, 10, 15, 15.625, 20, 30, 31.25, 45, 50, 60, 62.5, 100, 125, 150, 187.5, 250kgf (*Optional)
Vickers test range	HV (0.5*), 1, 2, 3, 5, 10, 20, 30, 50, 100; HVT 50, 100kgf (*Optional)
Brinell test range	HB1/1, 2.5, 5, 10, 30kgf; HB2.5/6.25, 15.625, 31.25, 62.5, 187.5kgf; HB5/ 25, 62.5, 125, 250kgf; HB10/ 100, 250kgf; HBT2.5/62.5, 187.5kgf; HBT5/250kgf
Rockwell test scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm, Ralpha, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Test cycles	Automatic & Manual
Indenters	Brinell Balls 1 - 2.5 - 5 - 10mm; Vickers Diamond 136°; Rockwell Diamond Cone 120°; Rockwell balls 1/16", 1/8", 1/4", 1/2"; Some are optional
Force control	2-99 seconds
Data Output	RS-232 Serial Interface (printer/PC), USB
Specimen accommodation	TYPE A: Max. height: 300mm (standard) Max. throat: 150mm (standard) TYPE B: Max. height: 450mm Max. throat: 150mm
Cylindrical Surfaces	Starting at 3mm diameter
Machine dimensions	TYPE A: 250mm x 567mm x 1030mm TYPE B: 250mm x 567mm x 1180mm
Machine weight	TYPE A: 201kg, TYPE B: 212kg
Power Supply	220V / 50Hz other voltages and/or frequencies on request
Guarantee	1 year guarantee

Standard Delivery

- Diamond Rockwell indenter
- Vickers indenter
- Brinell indenter 2.5mm
- Hardness test block HRA
- Hardness test block HRC
- Hardness test block HRB
- Hardness test block HV30
- Hardness test block HB2.5/187.5
- Objective for 70x magnification
- Objective for 140x magnification
- Clamping protection nose
- Testing table ø80mm
- Installation & user manual
- Calibration certificate
- Toolset

Optional Accessories

- Objectives for 10x, 20x, 44x magnification
- Testing table ø150mm
- Testing table ø235mm
- V-Anvil ø80mm
- V-Anvil ø120mm
- Certified indenters & hardness test blocks
- Long Vickers indenter
- Other testing tables and XY-stages
- Precision vices, V-blocks and special clamps
- Software solutions for advanced applications
- Spindle protection cover

Universal Hardness Tester ESEWAY 7500 CCD Series

The ESEWAY 7500 CCD universal hardness tester is based on the successful ESEWAY 7500 load cell closed loop concept with indenter/objective swivel system. The success of the ESEWAY 7500 concept now continues in the new ESEWAY 7500 CCD.

The ESEWAY 7500 CCD is a hardness tester for all hardness procedures according to Rockwell, Superficial Rockwell, Brinell, Vickers and Knoop. Also possible are ball and indentation hardness testing for thermo plastics and the new Vickers depth (HVT) and Brinell depth (HBT) procedures.

The load range goes from 1 to 250kgf (optional from 0.5kgf). All procedures complying to EN/DIN/ISO, ASTM and JIS.

The new user interface IMPRESSIONS guarantees hassle free tester operation with a minimum amount of training. IMPRESSIONS allows you to operate the tester's main functions but also incorporates advanced algorithms for automatic impression detection and hardness measurement

ESEWAY 7500 CCD

Universal Hardness Tester ESEWAY 7500 CCD Series

ESEWAY 7500 CCD

EW-7500CCD	Universal hardness tester with video indent measuring system

TECHNICAL SPECIFICATION

Hardness scales	Brinell, Vickers, Rockwell, Superficial Rockwell, Knoop, Vickers depth (HVT), Brinell depth (HBT), Plastic
Optical	5 mega-pixel HD camera, indent zoom function
Load range	1-250kgf
Display	High resolution industrial LCD touch screen Optional: desk top LCD screen Optional: desk top LCD touch screen Optional: Height adjustable LCD touch screen
CPU	Embedded high performance PC with 2 solid state HD drives Optional: External high performance PC
Firmware	IMPRESSIONS, advanced hardness testing software including options for: manual measurement, automatic measurement, indent zoom function, scale, conversion, file storage, report printing, test program storage, machine settings storage, graphic interface for swivel system position
Standards	Conforms to ISO 6506, 6507, 6508, 4545, ASTM E18, E92, E10 & JIS
Test load type	Loadcell closed loop, force feedback system Complies to EN/ISO and ASTM standards
Test cycle	Automatic and indent evaluation
Test loads	(0,5*) 1, 3, 5, 10, 15, 15.625, 20, 30, 31.25, 50, 60, 62.5, 100, 125, 150, 187.5, 250kgf
Brinell test procedures	HB1 1, 2.5, 5, 10, 30 HB2.5: 6.25, 15.625, 31.25, 62.5, 187.5 HB5: 25, 62.5, 125, 250 HB10: 100, 250
Vickers test procedures	HV (0,5*) 1, 2, 3, 5, 10, 20, 30, 50, 100
Rockwell test procedures	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X,30X, 45X, 15Y, 30Y, 45Y, 30 TM, HMR 5/25
Indenter types (included)	Brinell Balls: 1, 2.5, 5, 10mm Vickers Diamond: 136° Rockwell Diamond Cone: 120° Balls: 1/16 in, 1/8 in, 1/4 in, 1/2 in
Load duration	0.1-255 seconds
Connectivity	USB-2(6) RS-232, UTP RJ45, LAN, W-LAN
Specimen accommodation	Maximum test height 300mm, maximum throat 220mm
Specimen access	External surfaces,internal surfaces with goose neck adapter (optional)
Dimensions	620mm x 250mm x 900mm (L x W x H)
Weight	170kg
Power Supply	230V / 50Hz other voltages and/or frequencies on request

Standard Delivery

- Objective for 70x magnification
- Objective for 140x magnification
- Clamping protection nose
- Testing table ø80mm
- Power cable
- Installation & user manual
- Eseway certificate

Optional Accessories

- Objectives for 10x, 20x, 44x magnification
- Testing table ø150mm
- Testing table ø235mm
- V-Anvil ø80mm
- V-Anvil ø120mm
- Certified indenters and hardness test blocks
- Long Vickers indenter
- Other testing tables and XY stages
- Precision vices, V-blocks and special clamps
- Software solutions for advanced application

Universal Hardness Tester EW-9000 Series

EW-9000 Series
1kgf to 3000kgf, 6 Position Motorised Turret

Universal Hardness Tester EW-9000 Series

The EW-9000 Series represents the latest top of the range development in universal hardness testing. Modern design, innovated technology, multi purpose hardness testing instrument, based on the application of mechatronic components and high resolution video machine vision systems. A superior level of precision combined with high definition imaging creates an almost unlimited field of applications.

The EW-9000 Series represents universal hardness testing in the most versatile meaning. Aircraft engine parts, automobile parts, production lines, general quality assurance and laboratory use are all fields covered by the EW-9000 Series.

Manual operation or full scale automation to the highest possible level are both standard on the EW-9000.

The EW-9000, Load Cell, Closed loop, Force feedback system is suitable for the following:

Optical Hardness Testing Methods:

- Vickers (HV), EN ISO 6507, ASTM E 92
- Knoop (HK) ISO 4545, 4546
- Brinell (HB) EN ISO 6506, ASTM E 10

Depth Measuring Hardness Testing Methods:

- Rockwell (HR) EN ISO 6508, ASTM E 18
- Vickers depth measurement HVT VDI/VDE 2616-1
- Brinell depth measurement HBT VDI/VDE 2616-1
- Ball indentation hardness (H) (ISO 2039-1) (plastics)

Features

- Rockwell, Superficial Rockwell, Vickers, Knoop, Brinell, Ball indentation, HVT and HBT scales
- Superior range of test loads/force application ranging from 1kgf to 3000kgf (over 3 models)
- Fixed work piece position (no spindle)
- Descending test head with automatic work piece detection
- Free definable, manual or motorised 6 position turret for objectives and indenters of choice
- High definition optical system for images of 0.7x to 1000x magnification
- PC based hardness testing firmware and database file system as standard
- Large, adjustable 15" industrial touch screen (or mouse with normal 22" LCD screen)
- Automatic or manual focus, manual or fully automatic indent measurement standard
- Built-in hard disk offers nearly endless file storing, standard
- LAN, WLAN, USB-2, RS-232, Printer and DVI connectivity, standard
- On board built-in driver for (optional) motorised X-Y stage, standard
- Free definable test patterns case depth, traverse, free style, etc., optional
- Machine covers made of shock, damage and fire proof recyclable materials
- Large range of optional accessories
- Large test piece accommodation H=300mm, D=220mm
- 3 years free firmware upgrade, standard
- Designed and manufactured in The Netherlands, 1 year limited guarantee

Universal Hardness Testers EW-9000 Series

6 Position Turret

A special feature of the EW-9000 is the motorised turret which comes as standard on each system. The turret can hold 3 different indenters and 3 objectives up to 40x magnification, or 6 different indenters on a PURE ROCKWELL model.

Combine the turret with an optional X-Y stage, a rotary table or inclination table and create the worlds most comprehensive 4 or 5 axis hardness testing system.

Workpiece position is fixed. No hand wheels, no difficult supporting and no spindle to carry heavy parts. No wear and tear caused by heavy work pieces. No work load and no additional drive systems required.

Protection, Safety, Online Systems

EW-9000 intelligent sensor systems will register any irregular or unusual forces being applied to the turret, and will stop the test head from descending. In this way the system cannot cause injuries. No significant force is applied when any of the objectives are in viewing position.

The EW-9000 test head with force actuator, with or without turret, can be used in on-line structures or integrated in to production lines requiring automatic testing procedures. The newly developed optical system allows stunning, high definition indent magnification (0.7x to 1000x). Refined algorithms guarantee accurate automatic measurement.

EW-9000 Firmware

EW-9000 Firmware is the advanced user operating system of the EW-9000 Series. The software incorporates, manual and automatic measurement for all scales, image editing, file storing, image storing, report printing, turret operation, manual or automatic focussing and many other advanced functions.

The firmware converts to 3 different hardness (and tensile) scales simultaneously. The conversions can be set to material and standard (ISO/ASTM).

The system also controls an (optional) X-Y stage, rotary or inclining table that can be plugged into the standard built-in driver of the tester. No additional charges, no external devices.

In combination with an X-Y stage the tester offers the option of running case depth hardness programs, pre defined testing patterns and/or other specific or special tasks defined by the user.

All data can be copied or exported in to MS applications like Word, Excel, or a report generator that emails test results directly to your workstation, or server. All data can be accessed over the LAN or WLAN connections.

Universal Hardness Testers EW-9000 Series

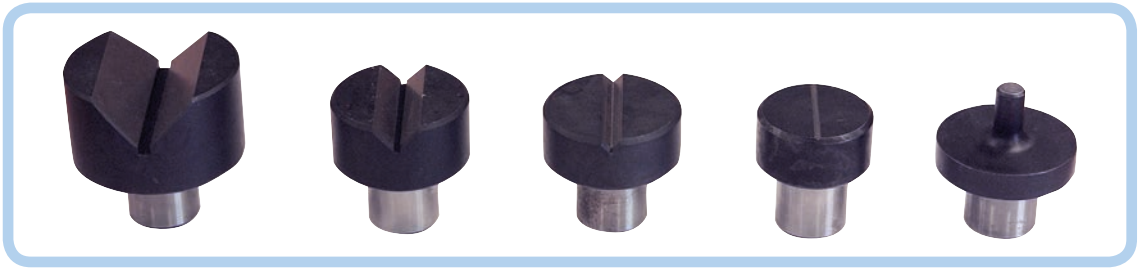
Anvils, Test Tables, Special Indenters

Each EW-9000 is supplied with a standard set of test anvils and work tables.
Each set includes 1 V-groove anvil, 1 flat anvil 80mm, 1 large round testing table ø200mm.

Additionally, you can opt for a large range of specific anvils such as a spot anvil, set of V-groove anvils, tungsten alloy or diamond surface anvils.

The tester can be equipped with a furnace or cooling unit to test work pieces under high or low temperature. Robot work piece loading and unloading can be supported by the built-in industrial computer.

To support large work pieces or cylinder blocks you can opt for the (350mm x 250mm) large working stage that incorporates T-grooves for solid work piece fixing.



X-Y Stages, Rotary Tables, Inclination Devices

Being Universal means being ready for any task. The EW-9000 can be equipped with a variety of X-Y stages suitable for different applications. Different test forces require different specifications of the X-Y stages. Size, test load and positioning accuracy can be offered according to your particular requirement.

CNC rotary tables and inclining testing tables are available depending on the complexity of your work pieces.

Universal Hardness Tester EW-9000 Series

TECHNICAL SPECIFICATION

	EW-9001 Universal	EW-9002 Universal
Scales / Test Loads/Force	**1kgf to 250kgf**	**3kgf to 750kgf**
Rockwell, A, B, C, D, E, F, G, H, K, L, M, P, R, V	All scales	All scales
Superficial Rockwell, N, T, X, Y	All scales	All scales
Macro Rockwell HRM	Yes	Yes
Vickers HV	1kgf to 120kgf	3kgf to 120kgf
Knoop	All scales	All scales
HVT	50, 100kgf	50, 100kgf
Brinell	1kgf to 250kgf	3kgf to 750kgf
HBT	5/250	5/250
H (ball indentation)	Up to 250kgf	Up to 750kgf
Force Application System		
Linear force actuator	Standard	Standard
Load cell, closed loop, force feed back system	Standard	Standard
Motorised heavy duty TURRET with 6 positions	Standard	Standard
Indenter positions	3	3
Objective positions	3	3
LED optical indent illumination	Standard	Standard
LED ring light indent illumination	Optional	Optional
Optical Measuring System		
5 mega pixels optical ZOOM system	Standard	Standard
Auto focus	Standard	Standard
Manual focus	Standard	Standard
Fully automatic indent measuring	Standard	Standard
Manual on screen indent measuring	Standard	Standard
Zoom and magnification ratio	0.7x to 1000x	0.7x to 1000x
Dual view working area overview camera	Optional	Optional
External Electronic Brinell microscope and objectives	No	No
Depth Measurement System		
Heidenhain™ high resolution scale & reading head	Standard	Standard
Hardware & User Interface		
Built-in industrial Pentium PC and harddrive	Standard	Standard
Adjustable 15" full color industrial touch screen	Standard	Standard
MS Windows 7 Ultimate license	Standard	Standard
EW-9000 hardness testing firmware	Standard	Standard
Automatic image and file storage	Standard	Standard
Stores and handles 3000 files & images	Standard	Standard
Stores and handles 9000 files & images	Optional	Standard
Forms 9000 set of customised certificates	Optional	Standard
Universal motorised X-Y stage controls	Standard	Standard
Connectivity		
External digital (DVI) TFT screen output	Standard	Standard
External keyboard & mouse connections	Standard	Standard
LAN (local area network connection)	Standard	Standard
WLAN (Wireless network connection)	Standard	Standard
Bi-directional RS-232	Standard	Standard
Printer / USB-2 output	Standard	Standard
Built-in motorized X-Y stage driver	Standard	Standard

Work piece accommodation height: 300mm
Work piece accommodation horizontal: 220mm from center
Machine dimensions: 1400mm x 420mm x 640mm (HxWxD)
Machine weight: 242kg
Tester colour (standard): Black / Metallic silver
Light source: White power LED (Opt. green/blue/red)
Power: 220V / 50Hz, others on request

Objectives: 3 installed for 0.7x to 1000x
Force tolerance: Max. < 1%
Force control: 1-99 sec.
Hardness resolution: 0.01 Rockwell, 0.1 Vickers, 1 Brinell

Universal Hardness Tester EW-9000 Series

TECHNICAL SPECIFICATION

EW-9003 Universal	EW-9004 Pure Rockwell	EW-9005 Pure Vickers	EW-9006 Pure Brinell
10kgf to 3000kgf	**3kgf to 150kgf**	**1kgf to 120kgf**	**10kgf to 3000kgf**
All scales	All scales	No	No
No	All scales	No	No
Yes	Yes	No	No
10kgf to 120kgf	No	500kgf to 120kgf	No
No	No	All scales	No
50, 100kgf	No	No	No
10kgf to 3000kgf	No	No	10kgf to 3000kgf
5/250	No	No	No
Up to 3000kgf	No	No	Up to 3000kgf
Standard	Standard	Standard	Standard
Standard	Standard	Standard	Standard
Standard	Standard	Standard	No
3	3 (or 6, option)	3	None
3	None	3	None
Standard	None	Standard	None
Optional	None	Optional	None
Standard	None	Standard	None
Standard	No	Standard	No
Standard	No	Standard	No
Standard	No	Standard	No
Standard	No	Standard	No
0.7x to 1000x	No	0.7x to 1000x	No
Optional	No	Optional	No
No	No	No	Standard
Standard	Standard	No	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	No	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	Standard
Standard	Standard	Standard	Standard
Standard	Standard	Standard	No

Standard Delivery

- Flat anvil ø80mm, V-anvil ø80mm, ø200mm testing table
- Installation & user manual

Optional Accessories

- Large testing table 350mm x 250mm with T-grooves
- Extra large testing table 450mm x 350mm with grooves and support
- Long bar supports, to ease testing long bars
- Motorised X-Y stages, motorised rotary or tilting tables
- Built-in 5 axis support driver
- Certified indenters and reference blocks (DKD, UKAS, ASTM)

Universal Hardness Tester EW-9500 Series

Load cell, closed loop, linear force actuator, fixed workpiece position

Force configuration for maximum 250kgf, 750kgf or 3000kgf

6 positions modular motorised turret, 5 Mp built-in camera, Optional overview camera

LED illumination, LED ringlight

Microscope quality optical system with long working distance objectives

Motorised spindle

High performance PC, Windows 7 operating system with refined algorithms for automatic image measuring system

15" high resolution industrial touch-screen

EW-9500 Series
1kgf TO 3000kgf, 6 Position Motorised Turret

Universal Hardness Tester EW-9500 Series

The EW-9500 is the universal hardness tester most suitable for heavy duty testing in the Eseway standard range of testers. Partly based on the technology of the EW-9000. Built for tough environments, the floor type welded frame reaches a height of 2 meters and offers a work space of not less than 650mm height and a throat depth of 300mm.

Rockwell, Vickers and Brinell, but also pure depth test methods such as H, HVT and HBT are part of the standard test procedures of the EW-9500. 3 models cover a range of test loads either up to 250kgf, 750kgf or 3000kgf.

The frame of the EW-9500 is equipped with a heavy duty motorised spindle, allowing positioning of the test piece on the required working height. The EW-9500 has a descending test head allowing each test piece to be tested on an ergonomic working height. The linear actuator of the EW-9500 is equipped with a load cell closed loop system guaranteeing excellent accuracy and a wide range of fast testing procedures.

The test head is equipped with a 6 positions modular turret (indenters and objectives) and an optical zoom video system with 5mp HD camera. High performance PC driven automatic and manual indent measurement with automatic filing and storage functions.

Refined algorithms for automatic measurement on materials normally less suitable for automatic measurement.

EW-9501	Heavy duty, video based universal hardness tester, test forces 1kgf to 250kgf
EW-9502	Heavy duty, video based universal hardness tester, test forces 3kgf to 750kgf
EW-9503	Heavy duty, video based universal hardness tester, test forces 10kgf to 3000kgf

TECHNICAL SPECIFICATION

Hardness scales	Brinell, Vickers, Rockwell, HVT, HBT
Load application	Load cell, force feed back, closed loop system
Load range	1-250kgf, 3-750kgf, 10-3000kgf
Motorised turret	3 indenter positions; 3 objectives positions
Optical system	High definition, 5Mp machine Vision system
Objectives	3 installed for 0.7x - 1000x magnification
Scale resolution	0.0005mm (0.5 micron)
Electronic system	High performance built-in PC, Windows 7, 15" full color touch screen, automatic and manual measurement
Standards	Complies to all applicable EN/ISO and ASTM standards
Test loads	1, 2, 2.5, 3, 5, 10, 15, 15.625, 20, 30, 31.25, 45, 50, 60, 62.5, 100, 125, 150, 187.5, 250, 750, 3000kgf
Vickers test range	1-120kgf (depending on model)
Brinell test range	1-3000kgf (depending on model)
Rockwell test scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
Test cycles	Automatic & Manual
Force control	2-99 seconds
Connectivity	USB-2, Blue tooth, WLAN, LAN
Specimen accommodation	Max. height: 650mm Max. throat: 300mm
Machine dimensions	1930mm x 1130mm x 470mm (HxDxW)
Machine weight	870kg
Power supply	220V / 50Hz others on request

Standard Delivery

- Motorised turret with 6 positions
- Objectives for 0.7x - 1000x magnification
- Built-in 3 axis support driver
- Large testing table
- Installation & user manual
- Eseway calibration certificate
- Toolset

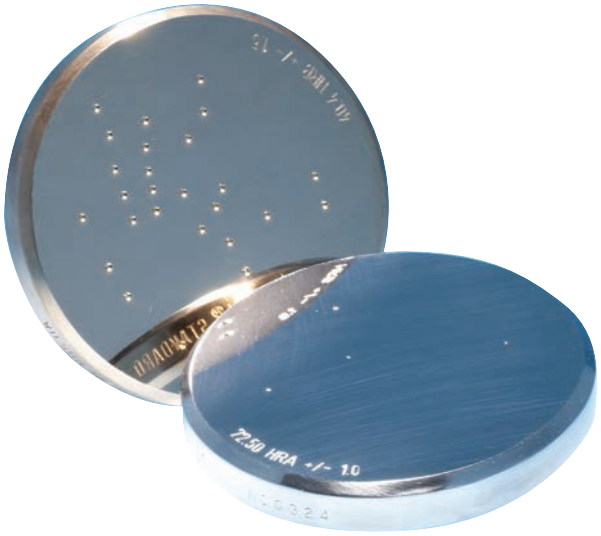
Optional Accessories

- Built-in 5 axis support driver
- Testing table ø235mm
- V-Anvil ø80mm
- V-Anvil ø120mm
- Certified indenters & hardness test blocks
- Long Vickers indenter
- Other testing tables and XY-stages
- Precision vices, V-blocks and special clamps

Hardness Reference Blocks For All Scales

With official calibration certificates UKAS, DKD or ASTM

CV Instruments hardness reference blocks are used for annual verification and calibration of hardness testing machines, as well as for periodical check and sometimes for overtaking of hardness scales on a hardness testing machine. That's why hardness reference blocks are a necessary help of industrial Quality Management. Only the use of high quality, precise hardness reference blocks calibrated to applicable standards can ensure the functionality and relative reliability and accuracy of measurement of a hardness testing machine.



The hardness reference blocks used for indirect verification should conform largely to the workpiece to be tested, in terms of material characteristics and hardness range. For this reason a hardness reference block made of aluminium was developed for the lower hardness range which can not be covered by steel, using new materials technology methods.

When using hardness reference blocks it is irrelevant whether the value of the nominal hardness to be delivered corresponds exactly to the actual calibration value observed, since scale adaptation should be carried out with at least two hardness values.

A hardness reference block shall only be used as according to the standards to that method and test condition for which it was calibrated.

CV Instruments certified hardness reference blocks are available as folllows and all conform to the international standards as mentioned above.

TECHNICAL SPECIFICATION

All CV Instruments hardness reference block certificates are based on following international standards:

Brinell	DIN-EN-ISO 6506-3	ASTM E 10
Vickers	DIN-EN-ISO 6507-3	ASTM E 92 / E 384
Rockwell	DIN-EN-ISO 6508-3	ASTM E 18
Knoop	ISO 4545-3	ASTM E 384
Rockwell carbide	DIN 30999	ISO 3738
Martens hardness	DIN 50359	ISO DIS 14577

CV Instruments certified hardness reference blocks are available as follows and all conform to the international standards as mentioned above.

Scale	UKAS	DKD	DKD/MPA	ASTM	CV
Regular Rockwell (all scales)	■	■	■	■	■
Superficial Rockwell (all scales)	■	■	■	■	■
Brinell (all scales)	■	■	■	□	■
Macro Vickers (all scales)	■	■	■	■	■
Micro Vickers (all scales)	■	■	■	■	■
Knoop	■	■	■	■	□
Martens hardness	■	■	■	■	□

Order your blocks based on nominal values.
Please ask for our separate product list of nominal hardness values available per hardness scale and type of certificate.

Hardness reference "soft" blocks made of aluminium

These CV Instruments reference blocks are available with DKD/MPA certificate only.
For several years there has been a need for "soft" blocks.
Using new materials technology methods, it is now possible to produce blocks made of aluminium.
They are available in lower nominal values in Rockwell, Brinell and Vickers scales. Ask for our separate sales list.

Indenters For All Hardness Scales

With official calibration certificates UKAS, DKD or ASTM

CV Instruments offers a wide range of indenters. All certified indenters will be issued with a certificate traceable to internationally recognised standards such as UKAS, DKD or ASTM. We also offer low cost factory certified indenters and specials (see below).

Specials

CV Instruments also offer special adapters for indenters to enlarge the field of application. Small gooseneck adapters are available in three sizes to permit regular or superficial Rockwell hardness testers to perform internal tests on rings, tubes and annular parts where the inside diameter, plus the wall thickness, is less than 50.8mm or 2".

These adapters will fit any of the standard Rockwell hardness testers. The gooseneck adapter can be clamped into the bottom of the plunger rod (in the same manner as an indenter) and is not heavy enough to affect a reading due to increasing the applied load. The minimum internal diameter which can be tested is 11.5mm or 7/16".

Ask for our separate product list of indenters.

INDENTER TYPE CV INSTRUMENTS

Scale	UKAS	DKD	ASTM	CV
Rockwell type 120° diamond cone	■	■	■	■
Rockwell ball indenters	■	■	■	■
Steel Rockwell ball indenter - 1/16" dia.				
Steel Rockwell ball indenter - 1/8" dia.				
Steel Rockwell ball indenter - 1/4" dia.				
Steel Rockwell ball indenter - 1/2" dia.				
Carbide Rockwell ball indenter - 1/16" dia.				
Carbide Rockwell ball indenter - 1/8" dia.				
Carbide Rockwell ball indenter - 1/4" dia.				
Carbide Rockwell ball indenter - 1/2" dia.				
Spare steel balls Rockwell in packs of 10	■	■	■	■
Spare carbide balls Rockwell (singles)	■	■	■	■
Brinell ball indenters	■	■	■	■
Carbide ball indenter - 1mm dia.				
Carbide ball indenter - 2mm dia.				
Carbide ball indenter - 2.5mm dia.				
Carbide ball indenter - 5mm dia.				
Carbide ball indenter - 10mm dia.				
Spare Brinell carbide balls (singles) all sizes	■	■	■	■
Vickers Pyramid 136°	■	■	■	■
Micro Vickers 136°	■	■	■	■
Micro Knoop	■	■	■	■